

What is Claimed is:

1. An article, comprising

a textured metal substrate having formed thereon an epitaxial buffer layer comprising a material selected from the group consisting of [SrTiO₃,] LaAlO₃, and SrLaAlO₄.

2. The article of claim 1, wherein said metal substrate contains Ni.

3. The article of claim 1, further comprising a superconducting layer on said epitaxial buffer layer.

4. The article of claim 3, wherein said superconducting layer is chosen from the group consisting of YBa₂Cu₃O_{7-x}, YbBa₂Cu₃O_{7-x} and NdBa₂Cu₃O_{7-x}.

5. The article of claim 3, further comprising a final layer on said superconducting layer.

6. The article of claim 5, wherein said final layer is an insulator.

7. The article of claim 6 wherein said insulator is chosen from the group consisting of SrTiO₃, LaAlO₃, and SrLaAlO₄, CeO₂, YSZ and RE₂O₃, where RE is a rare earth metal.

8. The article of claim 5, wherein said final layer is a conductor.

9. The article of claim 8, wherein said final layer is chosen from the group consisting of Ag and LaNiO₃.

10. An article, comprising:

a textured Ni-containing substrate;
an epitaxial buffer layer on said substrate, said epitaxial buffer layer being chosen from the group consisting of [SrTiO₃,] LaAlO₃, and SrLaAlO₄;

a superconducting layer of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ on said epitaxial buffer layer; and a final layer on said superconducting layer.

11. An electrolyte for an SOFC, said electrolyte comprising an epitaxial thin film.
12. The electrolyte of claim 11 wherein said epitaxial thin film comprises substantially a single crystal.
13. The electrolyte of claim 11, having an electrode directly deposited on a surface of the electrolyte.
14. An SOFC, comprising:
an anode layer;
an electrolyte layer on said anode layer; and
a cathode layer on said electrolyte layer; wherein
said electrolyte layer comprises an epitaxial thin film.
15. The SOFC of claim 14 wherein said epitaxial thin film comprises a single crystal.
16. A gas separation membrane, said membrane comprising a thin film that is dense, gas-tight and pinhole free.
17. A capacitor comprising a first conductive portion, a dielectric portion, and a second conductive portion, said dielectric layer comprising an epitaxial thin film.
18. The capacitor of claim 17,
wherein said thin film is formed of a ferroelectric material such that the capacitance of said capacitor is adjustable by varying a DC bias applied between the first and second conductive portions.
19. An epitaxial buffer layer formed by a process comprising,
providing a textured metal substrate,

performing combustion chemical vapor deposition for depositing on the textured metal substrate a buffer layer comprising a material selected from the group consisting of $[SrTiO_3]$, $LaAlO_3$, and $SrLaAlO_4$.

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